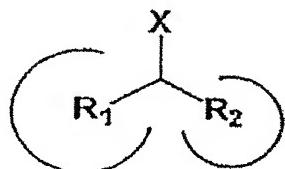


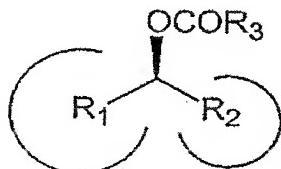
Amendments to the Claims

1. (Currently amended) A method of preparing (S)-chiral alcohol comprising:
 - (a) reacting in organic solvent a compound of the following chemical formula 1 as a starting material,
a racemization metal catalyst,
an acyl donor being capable of acylating an alcohol compound, and
a protein hydrolysis enzyme selected from the group consisting of stabilized or fixed subtilisin, chymotrypsin, papain, protease from Aspergillus oryzae, protease from Aspergillus melleus, protease from Streptomyces griseus, and protease from Bacillus stearothermophilus and being capable of stimulating the enantioselective acylation of a racemic compound to obtain a chiral ester compound of chemical formula 3; and
 - (b) hydrolyzing the chiral ester compound of chemical formula 3 to obtain (S)-chiral alcohol;

[chemical formula 1]



[chemical formula 3]



wherein X is -OH or = O, R₁, R₂ and R₃ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle,

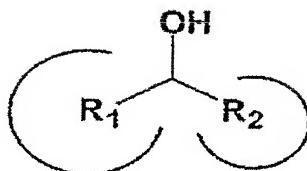
substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalky, wherein the R₁ group and the R₂ group can be linked together, and wherein a size of a circular arc indicates that the R₁ group is larger than the R₂ group.

2. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1, further comprising adding a hydrogen donor in ~~the (a)~~ step (a) when the starting material of chemical formula 1 comprises a ketone such that X is =O.

3. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1:

wherein the starting material of chemical formula 1 is [[the]] a compound of the following chemical formula 1a;

[chemical formula 1a]

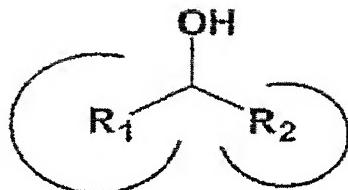


wherein R₁ and R₂ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalky; and wherein R₁ and R₂ can be linked together.

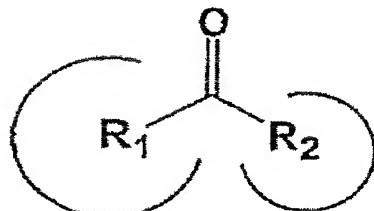
4. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 3, further comprising:

obtaining an alcohol compound of chemical formula 1a by adding a hydrogen donor to a ketone compound of the following chemical formula 1b to reduce it;

[chemical formula 1a]



[chemical formula 1b]

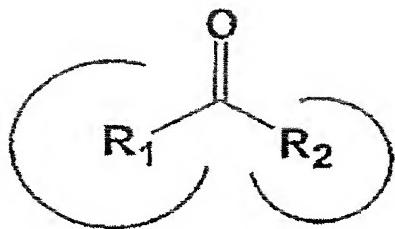


wherein R₁ and R₂ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalkyl; and wherein R₁ and R₂ can be linked together.

5. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1, further comprising:

adding a hydrogen donor to reduce a ketone group in step (a) step; wherein the compound of chemical formula 1 comprises chemical formula 1b;

[chemical formula 1b]



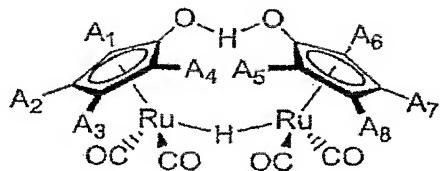
wherein R₁ and R₂ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalkyl; and
wherein R₁ and R₂ can be linked together.

6. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1, wherein the step (a) step of the reaction comprises a one-pot reaction and wherein the reaction is performed in one vessel.

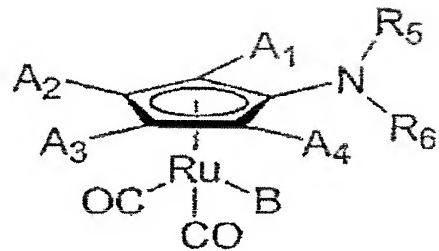
7. (Original) The method of preparing (S)-chiral alcohol according to claim 1, wherein the metal catalyst comprises a ruthenium complex compound.

8. (Original) The method of preparing (S)-chiral alcohol according to claim 1, wherein the metal catalyst is selected from the group consisting of ruthenium complex compounds represented by the following chemical formulas 4 to 8:

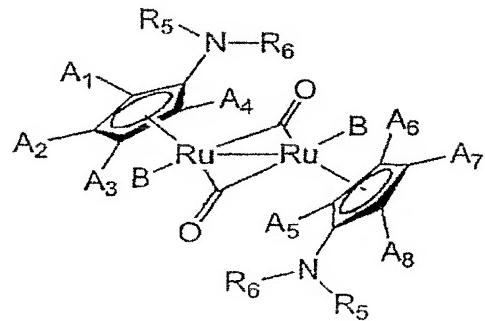
[chemical formula 4]



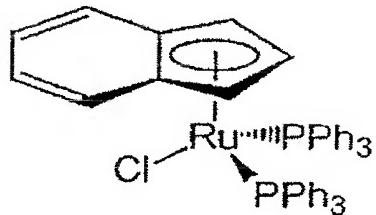
[chemical formula 5]



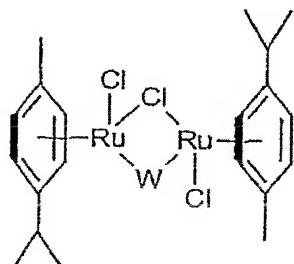
[chemical formula 6]



[chemical formula 7]



[chemical formula 8]



wherein A₁, A₂, A₃, A₄, A₅, A₆, A₇ and A₈ are independently hydrogen, substituted or unsubstituted C₁-C₁₀ alkyl, substituted or unsubstituted C₅-C₁₈ aryl, or substituted or unsubstituted C₂-C₂₀ heterocycle;

wherein R₅ and R₆ are independently hydrogen, substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₁-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalkyl; wherein B comprises a substituent selected from the group consisting of hydrogen, carbonyl, halogen and trifluoromethanesulfonate or there is no substituent in B site; and wherein W is hydrogen or a halogen.

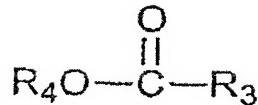
9. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 2, wherein the acetyl hydrogen donor comprises 2,4-dimethyl-3-pentanol, 2,6-dimethyl-4-heptanol, formic acid, or hydrogen.

10. (Original) The method of preparing (S)-chiral alcohol according to claim 1, wherein the acyl donor is linked to the R₁ group or the R₂ group of the chemical formula 1.

11. (Original) The method of preparing (S)-chiral alcohol according to claim 10, wherein the acyl donor is a substituent including a -OCO-R₃ terminal group linked to the R₁ or R₂ of the chemical formula 1.

12. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1, wherein the acyl donor is [[the]] a compound of the chemical formula 2; and

[chemical formula 2]



wherein R₃ and R₄ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalkyl.

13. (Canceled)

14. (Original) The method of preparing (S)-chiral alcohol according to claim 1, wherein the protein hydrolysis enzyme is subtilisin.

15. (Original) The method of preparing (S)-chiral alcohol according to claim 1, wherein the organic solvent is benzene, toluene, C₅-C₁₀ alkane, C₅-C₁₀ cycloalkane, tetrahydrofuran, dioxane, C₂-C₁₀ dialkylether, C₃-C₁₀ alkylate, C₂-C₁₀ cyanoalkane, C₃-C₁₀ dialkyl ketone, dichloromethane, chloroform, carbon tetrachloride, C₄-C₁₀ tertiary alcohol, or a room temperature ionic liquid.

16. (Currently amended) The method of preparing (S)-chiral alcohol according to claim 1, wherein the reaction temperature in step (a) is at a temperature between room temperature [[to]] and 80°C.

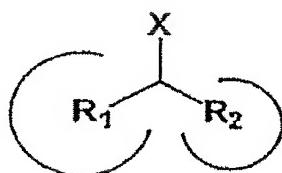
17. (Canceled)

18. (Currently amended) A method of preparing (S)-chiral ester comprising:

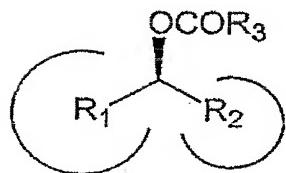
reacting in organic solvent [[the]] a compound of the following chemical formula 1 as a starting material,

a racemization metal catalyst,
an acyl donor being capable of acylating an alcohol compound, and
a protein hydrolysis enzyme selected from the group consisting of stabilized or fixed subtilisin, chymotrypsin, papain, protease from Aspergillus oryzae, protease from Aspergillus melleus, protease from Streptomyces griseus, and protease from Bacillus stearothermophilus and being capable of stimulating the enantioselective acylation of a racemic compound to obtain a chiral ester compound of chemical formula 3.

[chemical formula 1]



[chemical formula 3]



wherein R_1 and R_2 are independently substituted or unsubstituted C_1-C_{15} alkyl, substituted or unsubstituted C_2-C_{15} alkenyl, substituted or unsubstituted C_2-C_{15} alkynyl, substituted or unsubstituted C_5-C_{18} aryl, substituted or unsubstituted C_6-C_{18} arylalkyl, substituted or unsubstituted C_2-C_{20} heterocycle, substituted or unsubstituted C_3-C_{20} heteroarylalkyl, substituted or unsubstituted C_3-C_{15} cycloalkyl, substituted or unsubstituted C_3-C_{15} cycloalkenyl, substituted or unsubstituted C_6-C_{15} cycloalkynyl, or substituted or unsubstituted C_3-C_{20} heterocycloalkyl, and R_1 and R_2 can be linked together; and wherein a size of a circular arc indicates that the R_1 group is larger than the R_2 group.

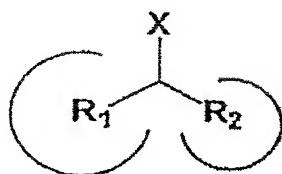
19. (Currently amended) The method of preparing (S)-chiral ester according to claim 18, further comprising adding a hydrogen donor in [[the]] step (a) step and when wherein the starting material comprises ketone where X=O.

20. (Canceled)

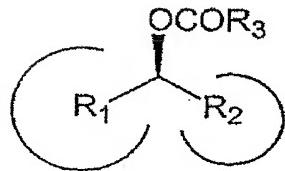
21. (Currently amended) A method of preparing (S)-chiral alcohol of the following chemical formula 1 comprising:

hydrolyzing the chiral ester of the chemical formula 3 prepared according to claim 18.

[chemical formula 1]



[chemical formula 3]



wherein X is -OH or = O,

wherein R₁, R₂ and R₃ are independently substituted or unsubstituted C₁-C₁₅ alkyl, substituted or unsubstituted C₂-C₁₅ alkenyl, substituted or unsubstituted C₂-C₁₅ alkynyl, substituted or unsubstituted C₅-C₁₈ aryl, substituted or unsubstituted C₆-C₁₈ arylalkyl, substituted or unsubstituted C₂-C₂₀ heterocycle, substituted or unsubstituted C₃-C₂₀ heteroarylalkyl, substituted or unsubstituted C₃-C₁₆ cycloalkyl, substituted or unsubstituted C₃-C₁₅ cycloalkenyl, substituted or unsubstituted C₆-C₁₅ cycloalkynyl, or substituted or unsubstituted C₃-C₂₀ heterocycloalkyl; wherein R₁ and R₂ can be linked together; and wherein a size of a circular arc indicates that the R₁ group is larger than the R₂ group.